HAZLETON
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REPORT TO

NALCO CHEMICAL CO.
P. O. BOX 249
CAMILLUS, NEW YORK 13031

48-HOUR *DAPHNIA PULEX* LC50 TEST USING NALSPERSE 7348 AND 7388

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1.0 Introduction

The Daphnia pulex tests described in this report were initiated on 10 September 1979 in response to a telephone request from Jim Scott, District 2 Manager, Nalco Chemical Co. on 30 August. Nalsperse 7348 and 7388 and authorization to proceed were received on 7 September 1979. The purpose of this test was to conduct a 48-hour LC50 test using 7348 and 7388 in equal concentrations (by weight) in a test series ranging from 100 to 10 mg/l as requested by the New York State Department of Environmental Control.

Test Material Treatment

Nalsperse 7348 is a clear colorless viscous liquid and 7388 is a light brown watery liquid. Solubilization was accomplished by adding 72 mg each of 7348 and 7388 to 1500 ml of diluent water and stirring (no heat applied) with a magnetic stirrer for two hours. Nalsperse 7348 was slow to dissolve while 7388 quickly dissolved. No sample residue remained after the solubilization period.

Because complete solubilization occurred, the final test concentrations were 100, 75, 50, 25 and 10 mg/l total 7348 and 7388 and a Diluent Control. Authorization to analyze for the actual concentrations was not received. Therefore, the test concentrations reported are the nominal concentrations based on the weight of test material added during solubilization.

2.0 Results

Insufficient mortalities to calculate an LC50 were observed in the requested test concentration series. The LC50 value of Nalsperse 7348 and 7388 in combination exceeds 100 mg/l.

Copies of the event and bench sheets and diluent water characterization are presented in Appendix A.

3.0 Materials and Methods

Diluent Water

The diluent water used to dissolve the test material, to obtain test concentrations, and for the diluent control was prepared by activated charcoal filtration. Activated charcoal filtration was utilized to remove chlorine, organic and hexane soluble chemicals, and detergents from laboratory tap water. The tap water source was Lake Michigan via the municipal water supply system. This water has been demonstrated to be safe for aquatic organism testing; all laboratory fish cultures are maintained in water treated in the above fashion and Daphina pulex cultures have attained numerous generations with no effect on fecundity.

Daphina Tests

Daphnia pulex were obtained from the HES laboratory culture, which originated from the Carolina Biological Supply Company. This culture has attained numerous generations since its origin. Daphnia less than 24 hours old were obtained by isolating gravid adult females 24 hours before test initiation and then selecting, from the isolation container, juvenile Daphnia as required for the test.

Static 48-hr LC50 tests were conducted using 250 ml beakers containing 200 ml of water. Each test concentration and diluent control was challenged using duplicate beakers. Tests were conducted at ambient light (daylight hours were approximately 6:00 to 19:30 with supplementary room lights from approximately 8:00 to 17:30) and temperature conditions (22 $\pm$ 2C). The

necessary volumes of toxicant (obtained as described previously) and diluent water (minus 5 ml) were placed in each beaker to obtain the percent concentration test series described above. Dissolved oxygen concentrations and pH were measured in each test container before the addition of test organisms.

Daphnia were removed from the isolation tank described above using a wide-mouthed pipette. Ten individuals were placed in a 10 ml graduated cylinder, the volume concentrated to 5 ml, and added to each beaker. Temperature was recorded in each container after addition of the Daphnia. Live-dead and temperature observations were made at the 24 hour and 48 hour period at which time the test was terminated. Dissolved oxygen concentrations and pH were measured in each test container after the live-dead counts were made. When sufficient mortalities to calculate an LC50 were observed, the 48-hour LC50 was calculated according to the log concentration versus percent mortality method using probits.

APPENDIX A

EVENT AND BENCH SHEETS AND DILUENT WATER CHARACTERIZATION

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AQUATIC TOXICOLOGY EVENT SHEET

Project No. 9034 Client Nalco Chemical Co Material Nalspers 7348 & 7388

Daphnia pulex

DATE	EVENT	INVESTIGATOR
29 Aug	Delhaute called in referal of static Daphnia test for Nalco. 7348 & 7388 will be used together in a trial period at Niagara Mohawk's Nine mile point plant to control slime in condensers. NYSDEC (Mr. Skinner) wants to see test done with the two materials in combination at the proportion of their use in the plant. Test series is to be 100, 75, 50, 25 and 10 mg/l. Test material and letter of authorization is to come from Nalco - Oakbrook. Dosage rate at plant will be 7348 - 15 gal/day, 7388 - 13.9 gal/day (each is applied at 125 lb/day). Test concs will therefore ~~start~~ test at 50 mg/l each and be diluted	Carp.
7 Sept	Received test material	Carp
10 Sept	Test started. concentrations as above. Stock solution prepared by dissolving 72 mg of both 7348 and 7388 in 1500 ml of activated charcoal filtered water. 7388 was a light brown watery liquid which quickly dissolved. 7348 was a clear viscous liquid which was slow to dissolve. Mixing was accomplished by placing the mixing vessel on a magnetic stirrer (no heat applied) for two hours. Some foaming of the test material was observed while preparing the test concentrations	Carp
12 Sept	Test complete: No LC50 can be calculated for the test range requested.	Carp.

Client Nalco Chemical Co Test Material 7348+7388 Start: Date 10 Sept 79 Time 1200

Address _____ Test Organism Daphnia pulex End: Date 12 Sept 79 Time 13:20

Concentration or Percent	Tank Number	Number of live Organisms					Temperature					Dissolved Oxygen					pH									
		0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
50 mg/l 7348	1	10	10	10			24.6	24.1	23.7			7.7	—	7.8			7.2	7.2	8.0							
50 mg/l 7388	2						24.7	24.0	23.7			7.7		7.8			7.2		8.0							
37.5 - 7348	3						24.6	24.0	23.7			7.6		7.8			7.2		8.1							
37.5 - 7388	4			↓			24.6	24.1	23.7			7.7		7.8			7.3		8.1							
25 mg/l 7348	5			9			24.6	24.1	23.7			7.7		7.8			7.2		8.1							
25 mg/l 7388	6			10			24.6	24.0	23.7			7.7		7.9			7.2		8.1							
12.5 - 7348	7						24.6	24.0	23.9			7.8		7.9			7.2		8.1							
12.5 - 7388	8						24.5	24.0	23.8			7.6		7.8			7.2		8.1							
5 - 7348	9						24.6	24.1	23.9			7.7		7.9			7.2		8.1							
5 - 7388	10			↓			24.6	24.1	23.9			7.6		7.9			7.2		8.0							
Diluent Control	11			9			24.5	24.1	23.9			7.7		7.9			7.3	7.3	8.1							
	12	↓	↓	10			24.6	24.0	23.9			7.7		7.9			7.3		8.1							
Calibration Value		—	—	—	—	—	✓	✓				9.5	—	7.9			✓	✓	✓							
Instrument Number		—					104471					104458					104430									
Investigator		start Carpenter					24hr. Carpenter					48hr. Carpenter					72hr. —					96hr. —				

Aquatic Toxicology Laboratory Diluent Water Characterization[a]

Parameter	Unit
Turbidity	0 NTU
Color	None
Odor	None
Total Hardness	136.9 ppm
pH	7.2
Conductivity	335 µmhos/cm
TDS (est. from Cond.)	200 ppm
Iron (Fe)	<1.0 ppm
Zinc	<1.0 ppm
Copper	<1.0 ppm
Nitrate (N)	<1.0 ppm

[a]Source: Lake Michigan via city water supply, activated charcoal filtration.